DOCUMENT RESUME

ED 478 899 CE 085 320

AUTHOR	Safford-Ramus, Katherine
TITLE	A Review and Summary of Research on Adult Mathematics Education in North America (1980-2000).
PUB DATE	2001-00-00
NOTE	7p.; In: Schmitt, M. J. and K. Safford-Ramus (Comps.) (2001). Adults Learning Mathematics-7: A Conversation Between Researchers and Practitioners. Proceedings of ALM-7, the International Conference of Adults Learning Mathematics (7th, Medford, MA, July 6-8, 2000) p. 39-44. The conference was hosted by the National Center for the Study of Adult Learning and Literacy (NCSALL) at Harvard University in conjunction with the Tufts University Department of Education and the NCTM-affiliated Adult Numeracy Network.
AVAILABLE FROM	Peppercorn Press, P.O. Box 693, Snow Camp, NC 27349 (Papers not sold individually, for complete volume: ISBN 1-928836-10-0, $25). Tel: 877-574-1634 (Toll Free).
PUB TYPE	Information Analyses (070) -- Speeches/Meeting Papers (150)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	Adult Basic Education; Adult Education; *Adult Learning; *Doctoral Dissertations; *Educational Research; Experimenter Characteristics; Financial Support; Graduate Study; High School Equivalency Programs; Instructional Improvement; Literature Reviews; Mathematics Anxiety; *Mathematics Instruction; Postsecondary Education; *Research Design; *Research Methodology; Researchers; Trend Analysis; Undergraduate Study
IDENTIFIERS	North America

ABSTRACT

The content, scope, and methodology of dissertations on adult mathematics education in North American were examined. The study database consisted of the abstracts of 113 dissertations written between 1980 and 2000. The topics covered in the individual dissertations were as follows: assessment/frameworks/standards (14); contexts (3); instructional approaches (31); parents (2); research into practice (36); teacher knowledge (4); theory (2); understandings (6); and workplace/vocational (7). Fifty-one percent of the dissertations examined adult mathematics education at undergraduate institutions, 19% examined ABE-level mathematics instruction, and 12% examined mathematics instruction in high school equivalency programs. Fifty-eight percent of the dissertation abstracts reviewed for the study identified tests as the vehicle used to conduct the study, whereas 42% used questionnaires or surveys, 23% relied heavily on interviews, 10% relied on analysis of student records, and 9% relied on observations. The most popular major topics examined were as follows: prediction of success; methods that may contribute to success; and math anxiety that may inhibit success if not neutralized or at least decreased. Only two dissertation abstracts indicated standards and the reform movement as their focus, and only three mentioned the theme of mathematics as problem solving. (The bibliography lists three references. A list of mathematics education-related dissertations by theme is appended.) (MN)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 478 899

A Review and Summary of Research on Adult Mathematics Education in North America (1980-2000)

Katherine Safford-Ramus
St. Peter's College, USA

Introduction

Since its inception as a field of study at the turn of the last century, the discipline of mathematics education has matured and become accepted by the North American education community as a credible research area (Kilpatrick, 1992). Over the past twenty years, substantial research has been conducted at all levels of mathematics education, kindergarten through graduate school, and reported in dissertations and journals. The identification of the subset of that research that examines mathematics education for adult or non-traditional students is the subject of this study. In this presentation I will report on the dissertations in mathematics education that are concerned with that population.

Methodology

The databases of Dissertation Abstracts International were searched using the Boolean argument "Adult AND Mathematics AND Education" on the "Subject" key. Two-hundred-and-five dissertations were found, 195 dating from 1980. The abstract for each dissertation was downloaded, printed, and reviewed for applicability. Eighty-two were culled for a variety of reasons. Some did not report research conducted in North America, others, although typified as adult, did not address the teaching of mathematics to adult students. For example, the students tested in one study were junior high school students. Eight abstracts were removed because they addressed interventions with teachers of mathematics and were deemed by this researcher to be concerned more with teacher in-service rather than direct teaching of mathematics to adults. Admittedly, this was a subjective decision and another researcher might choose to include them.

The journalist's questions of "Who, what, when, where, why, and how?" served as the basis of the analysis of the abstracts. The exact questions are indicated later in this report, but one example would be "Who is funding or supporting the research?" A coding template was then superimposed on each abstract printout and the data coded. Again, subjective decisions were made at times and the researcher invites others to duplicate this process in order to validate her findings. Results were then totaled and recorded in a spreadsheet, the contents of which served as input to the creation of the overhead transparencies shown during this presentation.

Who

From its inception, Adults Learning Maths (ALM) has been a forum that promoted dialogue between researchers and practitioners. An integral part of that dialogue is the encouragement for practitioners to undertake research projects in their work and an invitation to researchers to apply theory to practice by working in learning situations. The first "Who?" question, therefore, is "Who is reporting research?" The abstracts did not always provide clear answers to this question. In some cases, personal knowledge allowed me to assign the designation. Otherwise, unless the abstract clearly identified the author as a practitioner, the individual was counted as a researcher. As a result, an overwhelming majority of the dissertations, 88%, were determined to have been written by candidates whose primary role was researcher.

The second question under this heading was "Who funded or supported the research?" Support in many cases was manifest as "permission to conduct" rather than financial support. This was determined to be the case when an abstract indicated that the research was conducted in a particular section or class within an institutional setting. Sixty-three percent (71) of the dissertations fell into this category. Support for 23% (26) could not be determined from the abstract. The remaining 16 dissertations were funded by government agencies (11%) or industry (4%).

CE025320

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
This document has been reproduced as received from the person or organization originating it.
Minor changes have been made to improve reproduction quality.
Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
K. Safford-Ramus
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

BEST COPY AVAILABLE

What

In recent years, qualitative research has continued to gain acceptance within the mathematics education research community. Abstracts were therefore examined to determine if the researcher had incorporated one or more qualitative methodologies into the study. Only 17 (15%) dissertations were determined to be purely qualitative studies. An additional 14 (12%) combined qualitative and quantitative methods. A full 82 (73%) were conducted using quantitative methods. The following table shows a breakdown by year of studies that employed each method:

Table 1

Type	*80-81*	*82-83*	*84-85*	*86-87*	*88-89*	*90-91*	*92-93*	*94-95*	*96-97*	*98-99*
Qual	1	1			1	2	3	2	6	1
Quan	8	7	13	8	10	7	7	10	9	3
Both	1		1	4	1	1	3		2	1
Total	10	8	14	12	12	10	13	12	17	5

It would appear that qualitative methods have gained a foothold, but still represent the method of choice for a minority of doctoral candidates.

The program for ALM-7 was constructed around nine themes that emerged from the proposals submitted. The investigation of "What?" asked the question: "What ALM-7 themes, if any, are represented by the dissertations?" While a few abstracts could not be characterized by the themes, most could. A list of the dissertation authors sorted by ALM-7 themes is contained in the Appendix. While, as stated earlier, it was rarely clear that the researcher was a practitioner, the number of dissertations that could be characterized as "Research into Practice" or "Instructional Approaches" indicates a strong link between researcher and practitioner in adult mathematics research. The following table shows the breakdown by ALM theme:

Table 2

Theme	*Number*	*Percent*
Assessment/Frameworks/Standards (AFS)	14	12
Contexts	3	3
Instructional Approaches	31	27
Parents	2	2
Research into Practice	36	32
Teacher Knowledge	4	4
Theory	2	18
Understandings	6	5
Workplace/Vocational	7	6

Other non-ALM themes emerged during the abstract review process. Twenty-six (23%) of the dissertations investigated tests or personal factors that can be used to predict the success of an individual in the adult mathematics classroom. Another 11 (10%) reported findings about classroom methods or teaching styles that contribute to student achievement. Interventions with math-anxious students were discussed in 11 (10%) of the abstracts. Finally, the application of technology to adult learning situations was reported in ten entries, nine of which concerned computer-aided instruction (CAI) and one of which involved television.

When

Adult mathematics instruction occurs at levels comparable to all traditional student settings. Adult basic education starts with the simplest of mathematical concepts. Adult secondary education and General Educational Development (GED) preparation provides the equivalent of high school mathematics content. In 1996, 3,000,000 adults enrolled in ABE classes while over 900,000 pursued ASE instruction. Some 263,000 individuals over the age of 24 took the GED test in 1998. While not all these students engaged in mathematics classes in those years, it is safe to assume that a substantial number did at some point in their studies. Post-

secondary institutions offer mathematics instruction in both remedial and college-credit courses. In 1997, 35% of the undergraduate students at degree-granting institutions were at least 25 years old. If the threshold is lowered to 22 years of age (an additional 15.6% of the undergraduate population), then adult students were in the majority, 6.3 million out of 12.45 million. Now assume that students take mathematics during three of their eight undergraduate semesters. That assumption translates to 2.36,000,000 adult students taking undergraduate mathematics each year. It is probably more likely that the returning student enrolls for two semesters of remedial mathematics followed by two semesters of credit courses, so a less conservative figure would be 3.15 adult students per million per year.

The first "When?" question therefore asked the level of instruction addressed by the research in the dissertation abstracts. The distribution is quite different from the distribution of the students and, in all probability, reflects the academic position of the researcher. Fifty-eight of the dissertations (51%) were conducted at undergraduate institutions. Twenty-one (19%) were ABE level, while 13 (12%) were either ASE or GED. In some ways, the 51% figure is lower than might be expected. In the United States it is becoming increasingly difficult to obtain or maintain a position, get tenure, or achieve promotion at a tertiary institution without a doctoral degree. Candidates for a doctoral degree, therefore, would be likely to come from that educational level and use their classrooms as laboratories. On the other hand, instructors with elementary or secondary certification often supply ABE mathematics instruction. They are frequently part-time faculty and have little financial or career incentive to pursue a doctoral degree. In that light, the 19% rate is surprisingly high, even though the ABE population accounts for a substantial portion of the adults in formal instruction.

The second "When?" question asked, "In what year was the research conducted?" The reader can refer to Table 1 and see that, with the exception of a spurt of dissertations between 1996 and 1997, the rate has been fairly constant. It is interesting to note that the adult-centered degrees issued in that period accounted for 15% of the mathematics education doctorates awarded. It is heartening to note that researchers in adult mathematics education are persisting despite a paucity of research money compared to elementary and secondary funding sources.

Where

"Where" questions had less definitive answers than previous types. Abstracts were often vague about the geographic location where the research was conducted or reported as well as the institutional setting in which it was accomplished. Twenty-four dissertations (21%) gave no clue about the type of institution where the research took place. Sixty-one were situated at a tertiary institution: 31 (27%) at junior or community colleges, 30 (27%) at universities. Adult learning centers harbored 15 researchers (13%), with the remaining split between industry (6%) and government (5%). There was no apparent geographic clustering of either investigative or reporting locale.

How

The quantitative nature of most of the dissertations depended on easily quantified research instruments. Fifty-eight percent of the abstracts identified tests, predominantly normed tests, as the vehicle used to conduct the study. Forty-two percent used questionnaires or surveys. Qualitative components relied heavily on interviews (23%) with analysis of student records of transcripts (10%) and observations (9%) accounting for all but one of the studies. One dissertation was based on a case study. Keep in mind that dissertations often used more than one method, so the percentages reported total more than 100%.

Why

"Why?" was the question with the least clear answer. Obviously, the researchers undertook their task to complete doctoral degree requirements. Some reasons for pursuing the degree have already been suggested. Securing a present post or creating the potential for advancement are likely explanations. The selection of a topic for the project leaves more room for conjecture. It was disappointing to read abstracts that seemed designed as a quick and dirty approach to fulfilling a degree requirement. Far more appealing were those studies whose authors conveyed a passion for testing a theoretical framework or novel methodology as the heart of their studies. Their work provides a basis upon which later studies can be built.

Discussion

The number of dissertations that investigated adults learning mathematics was larger than I had anticipated when I undertook this project. They seem to be clustered around a few major topics: prediction of success, methods that may contribute to success, and math anxiety that may inhibit success if not neutralized or, at the very least, decreased. At first I found the interest in predicting success disappointing, almost a condemnation of teacher effort. Viewed in a positive light, however, the existing research provides a teacher with tools to identify "at risk" students. Their needs can then be addressed with interventions rooted in the research base on good practice and math anxiety programs.

What was discouraging was the paucity of studies that investigate the applicability of the K-12 National Council of Teachers of Mathematics (NCTM) standards for adult populations (NCTM, 1989, 2000). Only two of the abstracts indicated the standards and the reform movement as their focus. Mathematics as problem solving is a key theme of the new elementary and secondary curricula, yet only three abstracts identified that idea as a keystone. Other aspects of mathematics study, such as communication through writing or cooperative activities, were also neglected.

Only one of the dissertations addressed distance learning and the use of the Internet as a focal point, despite the fact that both of these ideas are hot topics in educational circles. It takes several years for dissertation research to reach fruition, so it is possible that these methodologies are currently being investigated and findings will be reported in the next few years. Many adults in the United States are not native speakers of English, yet none of the dissertations investigated the impact of English as a Second Language (ESL) or the implications of childhood mathematics learning outside North America on the study of mathematics in adulthood.

Conclusion

The body of doctoral research in adult mathematics education is small but cohesive. Much is known about the symptoms of student problems and work now needs to be continued or begun to devise and test "treatment plans" to help adult mathematics students gain confidence and to become successful in their studies of mathematics at all levels of the education system. Learning theories and teaching methodologies from traditional system research need to be analyzed and adapted for adult populations and then tested via doctoral studies.

References

Kilpatrick, J. (1992). A History of Research in Mathematics Education. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning*. New York: Macmillan.

National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards*. Reston, VA: NCTM.

National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: NCTM.

Appendix: Dissertations Ordered by ALM-7 Theme

Assessment/Frameworks/Standards
1981 Carabin, Robert Jerome
1983 Robinson, Donna Regina
1985 Moss, Lester Lavahn
1986 Puchon, Charles Anthony, Jr.
1989 Banner, Doris Vance
Leitsch, Patricia Kearns
Meeks, Kay Irene
1990 Carey, Karen Waite
Wheeler, Elizabeth (B. J.) Johanna
1992 Oliver, Richard Thomas
Refsland, Lucie Tuckwiller
1994 Blair, Judith Dee
Kestner, Sandra Fey Shelley
1996 Smith, Joseph Garratt

Parent Education
1990 Craig, Elizabeth L.
1991 Doering, William George

Instructional Approaches
1980 Willing, Delight Carter
1981 Jain, Barbara Jean
Stark, Jean Peterson
1982 Beachner, Lynne Anne
1984 Munyofu, Paul Malima
1985 Barnett, Thelma L.
Burnham, Paul Thomas
Friedman, Susan O.
Gould, Lillian Joyce Venable
Ungson-Devito, Maria Teresa
Wilson, Shirley Anne
1986 Massey, Frances Ann
Reid, Margie N. Barron
Robichaud, Kathleen Kienzle
1987 Farr, Charlotte Webb
Wilding, Marcella G.
1988 Basinski, Ida Rockwood
Grout, Don Hall
1990 Pace, John Patrick
1992 Ellman, June Christine Scholten
1993 Hsieh, Feng-Jui
1994 Wilder, Margaret Ramsey
1995 Burton, Beatrice Spencer
Greenwood, William Franklyn
1996 Berry, Andrew Jonathan
MacLeod, Susan H.
Newman, Glenn Austin Robert
1997 Gunasekera,Thilak Wijenayaka
Ramus, Katherine Safford
Wardlaw, Roosevelt

Instructional Approaches (continued)
1998 Martelly, Diana I.

Contexts
1982 Owings, Maria Facchina
1992 Masingila, Joanna O.
1997 Millette-McGuire, Beverly

Research into Practice
1980 Arnold, Carol Palmer
Boysen, Vicki Allen
Czarnecki, Karen Gordon
Mullinix, Patricia M.
1982 Ross, Kenneth Scott
Ehring, Howard A.
1983 Grady, Donna Katherine
Miller, Kathleen Noble
1984 Huntimer, Linda Carol
Jones, Martha Jane Everman
1985 Dugan, Patricia Ann
Lehmann, Christine Elyse Heinecke
McCarthy, William Francis
1986 Hoffer, Sharon Marie
Porter, Albert H.
Stewart, Barbara Martin
1987 Altiere, Gaetan
1988 Borakove, Larry Steven
Romero, John Edward
1989 Tobing, Asmara Raphy Uli Lumban
1990 Cunningham, Donna Davidson
Mayta, Fabian Esteban
1991 Russakoff, Marilyn
1992 Marsh, Joan Czaja
1993 Bartlett, Lucy
Fazzari, Alan Joseph
Skane, Marie Elizabeth
Sneller, Lowell Lee
1995 Galloway, Linda Jean Lowrey
Harper, Linda C.
Richardson, Samuel
1996 Johnson, Rayneld Rolak
1997 Cook, Roberta Parrino
Dias, Ana Lucia Braz
Szanto, Gabriella
1999 Steig, Mary Jo

Teacher Knowledge
1980 Richardson,Mikel Freeman
1993 Arriola, Leslie K.
1995 Nesbit, Tom
1998 Brown, Angela Denise Humphrey

Theory
1990 Hartman-Abramson, Ilene
1994 Barker, John Lewis

Understandings
1988 Ulrich, Mary Beth
1990 Munn, Anne Hodgkins
1992 Bockbrader, Barbara Ellen Berger
1995 Khooury, Hani Qustandi
1996 Beauford, Judith Elaine Mitchell
1997 Le, Xuan

Workplace/Vocational
1983 Holloway, G. Yvonne
1984 Hollobaugh, Patricia Susan
1986 Immergut, Brita
1988 Vanis, Mary Irene
Wilson, Odell D.
1994 Stephens, Geralyn Esther
1998 Moussavi, Massoud

No ALM-7 Theme Appropriate
1980 Travis, Thomas Riley
1987 Hopkins, Janet Claire
1989 Walsh, Velma Joy
1992 Trutna, Kevin Wayne
1997 Jost,Oliver R.
Parker, Sheila Latralle Blackston
1998 Bryant, Debra Deon
1999 Zachai, Judith

CE 085 320

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

ERIC

REPRODUCTION RELEASE

(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: A Review and Summary of Research on Adult Mathematics Education in North America (1980-2000)

Author(s): Katherine Safford-Ramus

Corporate Source: ADULTS LEARNING MATHEMATICS

Publication Date: 2001

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

☒

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, → please

Signature: Katherine Safford-Ramus	Printed Name/Position/Title: Katherine Safford-Ramus, Assistant Professor
Organization/Address: ST PETER'S COLLEGE, JERSEY CITY, NJ 07306	Telephone: 201-915-4930 FAX:
	E-Mail Address: Safford-K@spc.edu Date: 1/9/02

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org